

**EMPIRIC TREATMENT OF BACTERIAL PNEUMONIA**

<table>
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<tr>
<th>Clinical Setting</th>
<th>Likely Pathogens</th>
<th>Empiric Therapy</th>
<th>Usual Duration</th>
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<tr>
<td>Community-Acquired Pneumonia (CAP)</td>
<td><em>S. pneumoniae, H. influenzae, M. catarrhalis, atypicals</em> (Legionella spp., Mycoplasma pneumoniae, Chlamyphila pneumoniae)</td>
<td>First line: ceftriaxone + azithromycin&lt;br&gt;Alternatives: moxifloxacin</td>
<td>5 days&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ICU care</td>
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<td>Community-Acquired Pneumonia</td>
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<td>ICU care</td>
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<tr>
<td>Healthcare-Associated Pneumonia (HAP)</td>
<td>See algorithm on next page</td>
<td></td>
<td>7 days&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Hospital-Acquired Pneumonia (HAP)</td>
<td><em>S. pneumoniae, H. influenzae, S. aureus (including MRSA), Enterobactericeae</em></td>
<td>First line: ceftriaxone ± vancomycin&lt;sup&gt;f,g&lt;/sup&gt;&lt;br&gt;Alternatives: moxifloxacin ± vancomycin&lt;sup&gt;d&lt;/sup&gt;</td>
<td>7 days&lt;sup&gt;e&lt;/sup&gt;</td>
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<tr>
<td>Mild-to-moderate disease</td>
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<tr>
<td>Hospital-Acquired Pneumonia (HAP)</td>
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<td>Severe disease</td>
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<td>Ventilator-Associated Pneumonia (VAP)</td>
<td><em>P. aeruginosa, Acinetobacter spp., S. aureus</em> (including MRSA), Enterobactericeae</td>
<td>First line: piperacillin-tazobactam + vancomycin&lt;sup&gt;g&lt;/sup&gt;&lt;br&gt;Alternatives: cefepime + vancomycin&lt;sup&gt;d&lt;/sup&gt; ± tobramycin&lt;sup&gt;h&lt;/sup&gt;</td>
<td>7 days&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>&gt;48 hours after intubation</td>
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<td>Aspiration Pneumonia</td>
<td>Oropharyngeal flora</td>
<td>First line: ampicillin-sulbactam&lt;br&gt;Alternatives: moxifloxacin</td>
<td>7 days&lt;sup&gt;e&lt;/sup&gt;</td>
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<sup>a</sup> Antibiotic therapy should be tailored based on susceptibility results. If respiratory cultures negative, consider discontinuing antibiotics or deescalating to CAP therapy.

<sup>b</sup> If the patient had a documented multidrug resistant organism in the last 90 days, consider previous isolate susceptibility results when selecting empiric therapy.

<sup>c</sup> Consider extending to 7 days if not meeting the following criteria: defervesce within 72 hours AND no more than one CAP-associated sign of clinical instability if different from baseline (temp ≤ 37.8°C, HR ≤ 100 beats/min, RR ≤ 24 breaths/min, SBP ≥ 90 mmHg, Arterial O2 sat ≥ 90% or PO2 ≤ 60 mmHg on room air)

<sup>d</sup> Consider adding anti-MRSA coverage if post-influenza pneumonia.

<sup>e</sup> If no prompt resolution of symptoms (defined as improved PaO2/FiO2 ratio by 3-5 days of therapy), consider prolonging therapy to 10-14 days.

<sup>f</sup> Consider linezolid if MRSA pneumonia highly suspected (e.g. necrotizing pneumonia, previous MRSA pneumonia).

<sup>g</sup> If respiratory cultures negative for MRSA, consider discontinuing vancomycin or linezolid at 48-72 hours.

<sup>h</sup> Consider dual antipseudomonal coverage if prior intravenous broad-spectrum antibiotic use in past 90 days, need ventilator support, have septic shock, or in units where >10% of gram-negative isolates are resistant to agent considered for monotherapy.

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**References**


Revised: 2/16/2017
EMPIRIC TREATMENT ALGORITHM FOR HEALTHCARE-ASSOCIATED PNEUMONIA
BASED ON STRATIFICATION OF RISK FACTORS AND SEVERITY

Please see previous page for additional details on antibiotic selections.

Healthcare-Associated Pneumonia (HCAP)
Pneumonia and presence of one of the following:
» Hospitalization > 48 hours in past 90 days
» Residence in nursing home or long-term care facility
» Attendance at hospital or hemodialysis clinic in past 30 days
» Home infusion therapy (including antibiotics)
» Home wound care
» Exposure to a family member infection with an MDR pathogen

Severe pneumonia?
» Need for mechanical ventilation
» ICU admission

Risk factors for MDR pathogens
» Hospitalization > 48 hours in past 90 days
» Immunosuppression*
» Poor functional status*
» Antibiotic therapy in past 180 days

0-1 MDR risk factors
Treat for common CAP pathogens
Ceftriaxone
+ Azithromycin

Alternative: moxifloxacin

>2 MDR risk factors
Treat for MDR pathogens
Antipseudomonal beta-lactam
(e.g. piperacillin-tazobactam, cefepime)
+ Vancomycin
± Tobramycin

0 MDR risk factors
Treat for common CAP pathogens
Ceftriaxone
+ (Azithromycin or moxifloxacin)

>1 MDR risk factors
Treat for MDR pathogen
Antipseudomonal beta-lactam
(e.g. piperacillin-tazobactam, cefepime)
+ Vancomycin
± Tobramycin

Empiric therapy should be tailored based on culture results and susceptibility
If respiratory cultures negative for MRSA, consider discontinuing vancomycin or linezolid at 48-72 hours.
If respiratory cultures negative, consider discontinuing antibiotics or deescalating to CAP therapy.

+ Immunosuppression defined as any of the following:
  » ANC <1000
  » Congenital immunodeficiency
  » Splenectomy
  » HIV infection
  » Hematologic malignancy
  » Immunosuppressant therapy
  » Systemic steroid therapy (>10 mg prednisolone equivalent per day for 2+ weeks)

# Poor functional status defined as dependence on others to perform any 3 of the following:
  » Feed (includes tube feeds)
  » Bathe
  » Get dressed
  » Use toilet or cleaning self after use
  » Transfer from bed to chair and back
  » Partially or completely incontinent

* Poor functional status defined as dependence on others to perform any 3 of the following:
  » Feed (includes tube feeds)
  » Bathe
  » Get dressed
  » Use toilet or cleaning self after use
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